

February 24, 2010

Mr. Michael J. Annacone, Vice President Brunswick Steam Electric Plant Carolina Power & Light Company Post Office Box 10429 Southport, North Carolina 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS REGARDING THE REVISION OF LOCAL POWER RANGE MONITOR CALIBRATION FREQUENCY (TAC NOS. ME1892 AND ME1893)

Dear Mr. Annacone:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 254 to Renewed Facility Operating License No. DPR-71 and Amendment No. 282 to Renewed Facility Operating License No. DPR-62 for Brunswick Steam Electric Plant, Units 1 and 2, respectively. The amendments are in response to your application dated August 18, 2009, as supplemented by letter dated December 7, 2009. The amendments revise Technical Specification 3.3.1.1, "Reactor Protection System (RPS) Instrumentation," Surveillance Requirement 3.3.1.1.8, to increase the frequency interval between local power range monitor calibrations from 1100 megawatt-days per metric ton average core exposure (i.e., equivalent to approximately 907 effective full-power hours (EFPH)) to 2000 EFPH.

A copy of the related safety evaluation is also enclosed. A notice of issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

Finishih E. Sehr

Farideh E. Saba, Senior Project Manager Plant Licensing Branch II-2 Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Docket Nos. 50-325 and 50-324

Enclosures:

- 1. Amendment No. 254 to License No. DPR-71
- 2. Amendment No. 282 to
- License No. DPR-62
- 3. Safety Evaluation

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CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-325

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 254 Renewed License No. DPR-71

- 1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment filed by Carolina Power & Light Company (the licensee), dated August 18, 2009, as supplemented by letter dated December 7, 2009, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

- 2. Accordingly, the license is amended by changes to the Technical Specifications, as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-71 is hereby amended to read as follows:
 - (2) <u>Technical Specifications</u>

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 254, are hereby incorporated in the license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to start-up from the 2010 refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION

renda Mozafari

Brenda Mozafari, Chief (Acting) Plant Licensing Branch II-2 Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Attachment: Changes to the Operating License and Technical Specifications

Date of Issuance: February 24, 2010

ATTACHMENT TO LICENSE AMENDMENT NO. 254

RENEWED FACILITY OPERATING LICENSE NO. DPR-71

DOCKET NO. 50-325

Replace Page 4 of Renewed Operating License DPR-71 with the attached Page 4.

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

Insert Pages

3.3-5

3.3-5

(2) <u>Technical Specifications</u>

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 2^{54} , are hereby incorporated in the license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications.

For Surveillance Requirements (SRs) that are new in Amendment 203 to Renewed Facility Operating License DPR-71, the first performance is due at the end of the first surveillance interval that begins at implementation of Amendment 203. For SRs that existed prior to Amendment 203, including SRs with modified acceptance criteria and SRs whose frequency of performance is being extended, the first performance is due at the end of the first surveillance interval that begins on the date the Surveillance was last performed prior to implementation of Amendment 203.

(a) Effective June 30, 1982, the surveillance requirements listed below need not be completed until July 15, 1982. Upon accomplishment of the surveillances, the provisions of Technical Specification 4.0.2 shall apply.

Specification 4.3.3.1, Table 4.3.3-1, Items 5.a and 5.b

(b) Effective July 1, 1982, through July 8, 1982, Action statement "a" of Technical Specification 3.8.1.1 shall read as follows:

ACTION:

- a. With either one offsite circuit or one diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.A. sources by performing Surveillance Requirements 4.8.1.1.1.a and 4.8.1.1.2.a.4 within two hours and at least once per 12 hours thereafter; restore at least two offsite circuits and four diesel generators to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- (3) Deleted by Amendment No. 206.
- D. The licensee shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification, and safeguards contingency plans, including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The plans, which contain Safeguards Information protected under 10 CFR 73.21, are entitled: "Physical Security Plan, Revision 2," and "Safeguards Contingency Plan, Revision 2," submitted by letter dated May 17, 2006, and "Guard Training and Qualification Plan, Revision 0," submitted by letter dated September 30, 2004.

RPS Instrumentation 3.3.1.1

SURVEILLANCE	REQUIREMENTS (continued)	
	SURVEILLANCE	FREQUENCY
SR 3.3.1.1.5	Perform a functional test of each automatic scram contactor.	7 days
SR 3.3.1.1.6	Verify the source range monitor (SRM) and intermediate range monitor (IRM) channels overlap.	Prior to withdrawing SRMs from the fully inserted position
SR 3.3.1.1.7	Only required to be met during entry into MODE 2 from MODE 1.	
	Verify the IRM and APRM channels overlap.	7 days
SR 3.3.1.1.8	Calibrate the local power range monitors.	2000 effective full power hours
SR 3.3.1.1.9	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.1.1.10	Calibrate the trip units.	92 days
		(continued)

(continued)

Brunswick Unit 1

3.3-5



CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-324

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 282 Renewed License No. DPR-62

- 1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment filed by Carolina Power & Light Company (the licensee), dated August 18, 2009, as supplemented by letter dated December 7, 2009, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

- 2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-62 is hereby amended to read as follows:
 - (2) <u>Technical Specifications</u>

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 282, are hereby incorporated in the license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to start-up from the 2011 refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION

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Brenda Mozafari, Chief (Acting) Plant Licensing Branch II-2 Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Attachment: Changes to the Operating License and Technical Specifications

Date of Issuance: February 24, 2010

ATTACHMENT TO LICENSE AMENDMENT NO. 282

FACILITY OPERATING LICENSE NO. DPR-62

DOCKET NO. 50-324

Replace Page 3 of Renewed Operating License DPR-62 with the attached Page 3.

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

Insert Pages

3.3-5

3.3-5

as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

- (4) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use in amounts as required any byproduct, source, and special nuclear materials without restriction to chemical of physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components;
- Pursuant to the Act and 10 CFR Parts 30 and 70 to posses, but not separate, such byproduct and special nuclear materials as may be produced by the operation of Brunswick Steam Electric Plant, Unit Nos. 1 and 2, and H. B. Robinson Steam Electric Plant, Unit No. 2
- (6) Carolina Power & Light Company shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the facility and as approved in the Safety Evaluation Report dated November 22, 1977, as supplemented April 1979, June 11, 1980, December 30, 1986, December 6, 1989, July 28, 1993, and February 10, 1994 respectively, subject to the following provision:

The licensee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

- C. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:
 - (1) Maximum Power Level

The licensee is authorized to operate the facility at steady state reactor core power levels not in excess of 2923 megawatts (thermal).

(2) <u>Technical Specifications</u>

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. $282\,$, are hereby incorporated in the license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications.

RPS Instrumentation 3.3.1.1

SURVEILLANCE REQUIREMENTS (continued) SURVEILLANCE FREQUENCY SR 3.3.1.1.5 Perform a functional test of each automatic scram 7 days contactor. SR 3.3.1.1.6 Verify the source range monitor (SRM) and Prior to withdrawing intermediate range monitor (IRM) channels overlap. SRMs from the fully inserted position SR 3.3.1.1.7 -----NOTE------Only required to be met during entry into MODE 2 from MODE 1. 7 days Verify the IRM and APRM channels overlap. SR 3.3.1.1.8 Calibrate the local power range monitors. 2000 effective full power hours SR 3.3.1.1.9 Perform CHANNEL FUNCTIONAL TEST. 92 days SR 3.3.1.1.10 Calibrate the trip units. 92 days

(continued)

Brunswick	Unit	2



SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 254 AND 282

TO RENEWED FACILITY OPERATING LICENSES NOS. DPR-71 AND DPR-62

CAROLINA POWER & LIGHT COMPANY

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2

DOCKET NOS. 50-325 AND 50-324

1.0 INTRODUCTION

By letter dated August 18, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML092370284), as supplemented by letter dated December 7, 2009 (ADAMS Accession No. ML093560850), the Carolina Power & Light Company (the licensee) requested amendments to Renewed Operating Licenses DPR-71 and DPR-62 for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2, respectively. The proposed amendments would revise Technical Specification (TS) 3.3.1.1, "Reactor Protection System (RPS) Instrumentation," Surveillance Requirement (SR) 3.3.1.1.8, to increase the frequency interval between local power range monitor (LPRM) calibrations from 1100 megawatt-days per metric ton (MWD/T) average core exposure (i.e., equivalent to approximately 907 effective full-power hours (EFPH)) to 2000 EFPH.

The supplement letter dated December 7, 2009, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on December 1, 2009 (74 FR 62833).

Similar amendments to the one proposed by the licensee have been previously approved by the Nuclear Regulatory Commission (the Commission, NRC) staff for Grand Gulf Nuclear Power Station, River Bend Station, and Peach Bottom Atomic Power Station.

2.0 REGULATORY EVALUATION

The licensee addressed the regulatory requirements applicable to the proposed amendments in Section 4.1 of Attachment 1 to the application dated August 18, 2009. The regulatory requirements, criteria, and guidance applied by the NRC staff in its review are discussed below.

The licensee meets the intent of General Design Criteria (GDC) published in the *Federal Register* on May 21, 1971, as Appendix A to Title10 of the *Code of Federal Regulations* (10 CFR), Part 50.

The NRC staff evaluates the acceptability of the BSEP, Units 1 and 2 amendments based on adherence to the following applicable 10 CFR Part 50, Appendix A, GDC:

- GDC-10, the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.
- GDC-13, Instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges.
- GDC-20, The protection system shall be designed (1) to initiate automatically the operation of appropriate systems including the reactivity control systems, to assure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences and (2) to sense accident conditions and to initiate the operation of systems and components important to safety.

These amendments were also evaluated on the basis of 10 CFR 50.36(c)(3), "Surveillance requirements." This section states, "Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."

The NRC staff evaluated the proposed change to the BSEP, Units 1 and 2 TS SR to increase the surveillance interval to the LPRM calibration frequency from 1100 MWD/T to 2000 EFPH average core exposure. After evaluation, the NRC staff concludes that the intent of the GDC will still be met and BSEP, Units 1 and 2 will still be in conformance with 10 CFR 50.36(c)(3).

3.0 TECHNICAL EVALUATION

The LPRM system consists of fission chamber detectors, signal conditioning equipment, display and alarm equipment, associated power supplies, cabling, and trip functions. The LPRM system consists of 31 LPRM detector strings distributed radially throughout the core. Each detector string contains four fission detectors located at four different fixed axial heights. Each fission chamber produces a current that is coupled with the LPRM signal conditioning equipment to provide the desired scale indications. The chambers are vertically spaced in the LPRM detector dry tube assemblies to monitor four horizontal planes of the core, complementing the radial coverage given by the arrangement of the LPRM detector dry tube assemblies across the core.

Each LPRM dry tube assembly also contains a calibration tube for a traversing in-core probe (TIP). The LPRMs are calibrated by moving the TIP to the LPRM location where gain adjustment factors (GAFs) are determined and applied to each LPRM. The GAFs are used to adjust the LPRM current to compensate for detector decay; this calibration is necessary due to

depletion of fissile material lining the LPRM fission chambers. The calibrations are performed at power for all 124 LPRM fission detectors.

The LPRM system provides input into several other systems. The average power range monitor (APRM), the rod block monitor (RBM), the oscillation power range monitor (OPRM), the core monitoring system, and the plant computer receive input. The APRM uses reactor power calculated from a heat balance and is adjusted on a weekly basis. Because of this, the APRM system will not be affected by the extended LPRM calibration frequency. Both the RBM and the OPRM systems use relative changes in local neutron flux. Because relative changes are used for the extended calibration frequency, and therefore, increased signal uncertainty, will not affect the signal ratios used by the RBM and OPRM systems.

The amendments propose to increase the TS SR interval from 1100 MWD/T to 2000 EFPH; 1100 MWD/T is approximately equivalent to 907 EFPH. By doing so, the signal uncertainty will increase due to the calibration interval extension. The licensee increased the LPRM signal uncertainty used to determine the BSEP, Units 1 and 2 safety limit minimum critical power ratio (SLMCPR) uncertainty. The uncertainty value was increased to a value consistent with a calibration interval of 2500 EFPH. A 2500 EFPH was used due to the SR 3.0.2 allowance for a 25 percent extension in the calibration interval that would increase the maximum calibration interval from 2000 EFPH to 2500 EFPH.

The licensee determined and explicitly analyzed the BSEP LPRM detector uncertainty components, including cable non-linearity, detector non-linearity, random noise uncertainty, and detector sensitivity decay. This deconstructive technique allowed for an analytical treatment of the sensitivity decay based on the exponential decay law, correlated to LPRM fluence, rather than time. The licensee correlated the detector fluence to cycle exposure by using MICROBURN-B2 to calculate the average LPRM fluence over an actual cycle depletion calculation for BSEP, Unit 1. It should be noted that the licensee also considered the MICROBURN-B2 predictive uncertainties in its calculations. This analysis was performed in order to establish that the SLMCPR uncertainty assumption for LPRM uncertainty was conservative relative to the predicted LPRM uncertainty over the proposed calibration interval.

The BSEP-specific LPRM uncertainty is found to be 3.56 percent following a 2000 EFPH calibration interval and 4.19 percent following a 2500 EFPH calibration interval. The reload licensing analyses for BSEP, Units 1 and 2 cores considered an LPRM detector signal uncertainty of 4.30 percent. Therefore, the longer calibration period and increased uncertainty will not affect the safety analysis methods or core thermal limits in the BSEP COLR. The increase will also not affect any of the current safety analysis results documented in the BSEP, Units 1 and 2 Updated Final Safety Analysis Report (UFSAR) because the new numbers are still bounded by 4.30 percent.

The NRC staff evaluated the proposed change to the BSEP, Units 1 and 2 TS SR to increase the surveillance interval to the LPRM calibration frequency from 1100 MWD/T to 2500 EFPH (2000 EFPM plus 25 percent extension allowed by SR 3.0.2) average core exposure. The NRC staff determined that the increased uncertainty in the signal value of the LPRM will be bounded by the value used in the power distribution uncertainty applied in the SLMCPR analyses and will not affect other safety analysis methods used in the COLR and UFSAR. Therefore, the NRC staff concludes that the LPRM calibration interval changes proposed in the licensee's submittals are acceptable.

BSEP, Units 1 and 2. The acceptability of this extended interval will be subject to further review prior to operating under MELLLA+ conditions. This applicability statement is provided for licensee's awareness only and does not impose conditions on the NRC staff's approval.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of North Carolina official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change the surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (74 FR 62833; December 1, 2009). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Joshua Miller

Date: February 24, 2010

Mr. Michael J. Annacone, Vice President Brunswick Steam Electric Plant Carolina Power & Light Company Post Office Box 10429 Southport, North Carolina 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS REGARDING THE REVISION OF LOCAL POWER RANGE MONITOR CALIBRATION FREQUENCY (TAC NOS. ME1892 AND ME1893)

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A copy of the related safety evaluation is also enclosed. A notice of issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

/RA/

Farideh E. Saba, Senior Project Manager Plant Licensing Branch II-2 **Division of Operating Reactor Licensing** Office of Nuclear Reactor Regulation

Docket Nos. 50-325 and 50-324

Enclosures:

- 1. Amendment No. 254 to License No. DPR-71
- 2. Amendment No. 282 to
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